HINTS ON HOW TO TEACH THE FRYE GEOGRAPHIES

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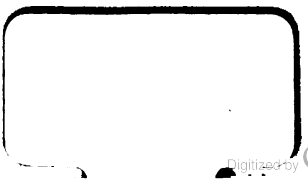

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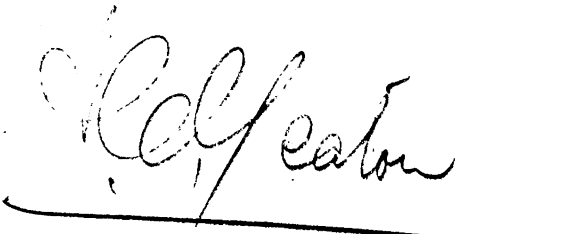

Hints on How to Teach the Frye Geographies

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PREFACE.

THIS booklet is not intended for a teachers' manual, but rather as a means whereby teachers may be put in sympathy with the author of the Frye Geographies. The difficulty of such an undertaking is fully realized, for the writer has never had the pleasure of listening to Mr. Frye. His conclusions are therefore those which come to him as a result of carefully studying these text-books. It is quite possible that in trying to explain the underlying principles of Frye's Geographies there may be a little light thrown upon what some persons are pleased to call "the new Geography."

The following pages comprise in a condensed form the series of geography talks given by the writer to the teachers of Grand Rapids during the winter of 1898–99, and are published at the request of several teachers who listened to those talks.

HOW TO TEACH THE FRYE GEOGRAPHIES.

CHAPTER I.

THE FOUNDATION PRINCIPLE.

WHEN a person puts forth a book it is safe to say that he has, or thinks he has, at least one idea which he wishes to lay before his readers. Unless he has such a message he should for the sake of humanity remain silent. In case the person is the author of a text-book, his new idea will, in all probability, be merely a new method which he wishes to introduce into the schools of the country. The subject-matter of the book may be as old as truth; the only new feature may be its method of presentation. This second aim of an author is not to be deprecated; in fact, in many lines of school work the chief question is, "How to present a truth," not "What is the truth?" The latter may have long since passed into the category of undisputed facts; the former may be a point around which still centers many a battle of opinion.

If we who are teachers will think back to the time when we were students in school, we shall remember that the geography taught us was merely the geography of location. Lessons were assigned us by the inch; if

the questions were short and numerous, the teacher gave us two inches and a half per day; if they were longer, we took three inches and a half, and if the printer had by chance leaded the lines, the teacher lengthened our lessons proportionally, giving us possibly five or six inches. When the recitation time came these questions were asked us in definite order and we were expected to answer each in turn. Looking back at such a drill, we must confess that but two benefits were derived — we learned the location of many places on the surface of the earth and memory was trained. In the absence of other exercise, the remaining powers of the mind would have atrophied.

Following this method of teaching geography there came another, which we may dub "the straight line method." It propounded such questions as: "In traveling from New York to Chicago, along what parallel would you journey; through what cities would you pass; across what states would you move?" Possibly this method had its value, but as the *genus homo* never thus moves in straight lines, his offspring rebelled at being forever considered birds of passage, and crows at that.

Method number two had its day, and teachers began to wonder if it were not possible to devise some plan to interest children in a subject which thus far had been the most uninteresting in the school curriculum. Some one hit upon the "journey method," and teachers and children made zigzag tours over the entire face of the earth. This plan had at least the defect of being somewhat rambling. Interest had been aroused, but

even the child's imagination ultimately revolted against forever making believe and never actually performing.

Finally an author, Tilden, impressed with the importance of the business relations of the world, gave us a text-book whose underlying principle is: "the commercial relations man bears to man." This book, though marking a decided advance, left out of consideration the causal relations existing between physical forces and human occupations. Moreover, the book does not profess to be adapted to beginners. It is only a text for advanced grammar grade pupils.

From time to time authors wrote so-called "Physical Geographies," whose place was distinctly marked as belonging to the high-school department. These books leaned heavily toward geology, and served to give many boys and girls the only glimpse they ever received into that wonderful story which the hand of God has written in the structure of the earth.

The time was ripe for a change — a clean-cut, well-marked and decisive transition. Mr. Alexis E. Frye finally gave to the pupils of the grammar school his Primary and Complete Geographies, the underlying principle of which is that

The vital geography, political geography and commercial geography of the world grow out of and are dependent upon the physical geography of the world.

True, this was not a new thought. Humboldt had long since shown the operation of physical forces in shaping the surface of the earth for the abode of man; Darwin had demonstrated the effect of those forces upon the animal and vegetable life, and Buckle had

proved that those same forces exercised a determining factor upon the political and social relations of mankind. Still these and a host of other authors had written books found simply upon library shelves and adapted to mature minds. Mr. Frye grasped this central thought and placed it before the children of America in a common school geography.

Mr. Frye's geographies are not only unique as grammar school texts in the underlying principle involved, but also in the manner in which that principle is taught. Teachers who use these books in the way they are intended to be used do not develop simply the power of memory. Those who study the books aright must compare concepts, and thereby train judgment; must compare and combine propositions, and thereby develop the ability to reason. Knowing certain general laws, pupils learn to determine for themselves the leading characteristics of any given locality. This method of work is the essential feature of the so-called "new geography."

Not understanding the underlying principle in Frye's "Geography," or the method of attack, some teachers meet with little success in trying to use the books. At first they are very much interested, the book being so novel. When this interest wears off, such teachers complain that the books are apparently without that which Professor Hinsdale so aptly calls "necessary handles." They then push aimlessly along, without grasping the principles, teaching their children by sheer memory many things about geography, but very little real geography.

What foundation has Mr. Frye for maintaining that the vital geography, political geography and commercial geography of the world grow out of and are dependent upon the physical geography of the world?

Consider the question of boundary lines. There are two kinds — natural and artificial. History shows that the former are permanent, the latter temporary. France and Spain have been at war time and time again. Whenever they have settled their difficulties and established a treaty of peace, the Pyrenees mountains have stood as the line separating the two countries. England and France have repeatedly met in death struggle. With one single exception, in the treaties of peace which closed those struggles, the English channel remained the boundary line. This exception proved to be but a temporary adjustment of the difficulties, and slowly the artificial boundary was pushed northward until it coincided with the natural one. One other nation has often engaged France in war. No natural boundary separates this country, Germany, from France; consequently when the treaties of peace have been established, settling their difficulties, the boundary lines have been pushed back and forth, leaving continually an area of contention between the two countries. To the northeast of Prussia once lay a little country, Poland, separated from the adjoining countries by no natural boundary lines. The time came when those countries united for the partition of Poland, and the little kingdom was swept from the map of the earth. Not so with Switzerland, situated in the heart of Europe, but hemmed in by a natural boundary of

mountains. It has stood intact for centuries. On every side nations have risen, flourished and decayed; still Switzerland remains; even though its form of government is a standing menace to the monarchies of Europe.

Not only are the pages of modern history replete with illustrations of the question involved, but the records of ancient nations give abundant illustration of the same truth. Scarcely a state in old Greece but had its boundaries marked in the configuration of the earth. For years the Alps served as the northern limit of the Roman empire, and even when the legions of Rome carried her eagles beyond that snow-capped range, the same mountains remained as before the barrier which separated the Roman citizens from the barbarians. As long as the Roman empire retained the Danube with its mountainous southern bank as its northeastern boundary it was safe, even though the wild hordes of Huns thronged the plains of Russia. But when her officers, false to their trust, granted those Huns the privilege of crossing that natural boundary, nothing could stay their onward march toward the Imperial City.

The Roman soldiers pushed the native Britons back from the fertile plains of southeastern England until those Britons took lodgment within the mountain fastnesses of Wales and Scotland. Then, in seeming imitation of Nature, they built a wall to serve as the northern boundary of Britain, hoping thereby to keep the Picts and Scots from invading the country. Similarly, in times long ago, the founders of the

Chinese empire raised a wall which should serve to protect them from their enemies on the north. This same general truth finds abundant negative illustration in the history of the New World. Five European nations originally laid claim to North America. Why have these titles been extinguished? Not merely because the English race is the strongest, but rather because Nature had fashioned a continent in which there are few natural boundary lines. The two remaining artificial boundary lines are rapidly being obliterated by commercial treaties, all tending toward the amalgamation of the great American continent into one mighty nation.

Not only have natural boundaries separated nations, but they have also served to keep separate and distinct the peoples who have lived upon opposite sides of those boundaries. The people of Transalpine and Cisalpine Gaul never coalesced. The Spaniards and French living on opposite slopes of the Pyrenees mountains have preserved their individuality. Though the Swiss live but a few miles from the Germans, they are distinct peoples. The French and English have entirely different traits. The tribes living on the southern slopes of the Caucasus mountains are so different from those living upon the northern slopes of the same mountains that they are easily distinguished as belonging to separate races.

It is interesting to note the effect of modern civilization upon natural boundaries. Every railroad which winds its way over the mountain pass, or plunges through a dark tunnel; every telegraph line which

flashes its messages over the mountains or under the sea; every steamship which carries its precious freight from country to country serves to break down natural boundaries and hasten the advent of "The parliament of man, the federation of the world." Modern engineering has given man that faith which enables him to say to the mountain, "Be thou removed," and behold it is cast into the sea.

From the time when Leonidas marshaled his Spartan band in the pass of Thermopylæ to the time when the high tide of the southern confederacy broke upon the crest of Mission Ridge, the god of battles has inhabited some Olympian height and decided the fortunes of war and the fate of nations along the natural boundaries which have separated countries. Of more importance to England than her entire army was the English channel when Napoleon saw nothing but that narrow strip of water between himself and world empire. No student of history can study the decisive battles of the world, or the campaigns of great captains, without being impressed with the important fact that the configuration of the earth has been a mighty factor in determining the results of such conflicts.

What then would Frye have the student see in studying the boundaries of a country? Not merely the location of those boundary lines, but whether they are natural or artificial; permanent or temporary; what their effect has been upon the nation's life; how they have separated or failed to separate adjoining peoples; how they have been a means of defense in time of war or a highway of commerce in time of peace.

For years teachers have recognized in a general way the effect of climate upon animal and vegetable life. They have called attention to the facts that the most luxuriant vegetation grows in the tropics; that deciduous trees are found in the temperate regions; that as one approaches the poles vegetation is more stunted, finally disappearing entirely; that animals living in the cold regions are abundantly supplied with a warm covering; that those found in the tropics are usually larger and more ferocious; that the temperature of the torrid zone tends to enervate the people who live in that region; that the temperature of the frigid zone necessitates such a struggle for existence, that people in those localities have no opportunity for intellectual advancement, and that only in the temperate regions does man reach his fullest development and establish the highest type of civilization. It remained, however, for Frye to write a geography series in which there should be placed before the school children the great thought that the animal and vegetable life native to any given region are determined largely by the physical geography of that locality; and that the forms of such life which man can introduce in any given region are also determined by the physical geography of that locality. Moreover, this same general truth obtains not only with reference to the lower forms of life, but also to man himself, except in so far as he can adapt himself to a greater variety of environment. To illustrate: The westerly winds blowing from the Pacific upon the western coast of the United States climb successively three ranges of mountains, each higher

than the preceding; then blow down the eastern slope of the Rockies, deprived of their moisture. The plains lying at the foothills of these mountains have, consequently, little rainfall. The only form of vegetation which could thrive is the bunch-grass. The native animal life must, therefore, be such as could depend upon this bunch-grass for food. This was the home of the buffalo. These animals roamed over the plains in vast herds, cropping the grass short, then moving on to fresh pastures. When advancing civilization drove the buffalo from his native plains, man supplied his place with the only kind of animals which could thrive upon that vegetation which had nourished the buffalo. Great herds of cattle are now pastured upon these plains and are driven from place to place as necessity demands.

Compare the valley of California with the so-called Great American desert. They lie in the same latitude, are but a few miles apart and have a like soil — the rock waste of adjacent mountains. Why is the one a garden spot, the other an arid waste? Why has one become the seat of a thriving population, the other remained the home of roving bands of Indians? Simply because one is well watered, while upon the other region scarcely any rain falls. But why this difference in the amount of rain? Surely it is not chance. Fixed laws must govern this phenomenon just as surely as they govern the movements of the planets. Knowing these laws and the relief forms of the two localities in question, the student is able to predicate the native life of those regions, even though he has never read a

description of either. Advancing a step farther toward his final conclusion, he determines why Nature makes one locality fitted for a great state, while man must supplement by irrigation the lack of rainfall before the other can be reclaimed for civilization. Apply the same general principles in comparing the valley of the Amazon with the Desert of Sahara. The physical geography of the northern parts of Africa and South America alone accounts for the dissimilarity. The leading points of difference can be determined by the student from the study of the map without memorizing a word of the text. It is this power of reasoning out the necessary, native life of any given locality that Mr. Frye would develop in the pupils.

The more advanced student can apply the principle in question to the determination of the seats of empire. It is a noticeable fact not only that every ancient civilization was located in a fertile region, but that some indigenous food grew luxuriantly in that locality. India had its rice, which yielded sixty fold; Egypt its date, which yielded an hundred fold; Mexico its maize and banana, which yielded abundantly; and Peru its potatoes, which furnished ample food for the vast population. When civilization advanced and spread into the less fertile regions of the world, transportation became more and more a business enterprise. As the means of transportation improved, localities were obliged to depend less and less upon their own products. In these closing years of the nineteenth century steam and electricity have brought to one table the products of all regions of the earth. Man's power to adapt

himself to his environment, assisted in a great measure by the improved means of transportation, is splendidly illustrated by the settlements among the niter beds of Chili and the gold fields of Alaska. In the former locality rainfall is unknown and the heat intense; in the latter snow is abundant and the cold intense. In both places vegetation is reduced to the minimum. Nature has done much to make these localities uninhabitable. Man has, however, taken up his abode in these inhospitable corners of the earth and depends for his sustenance upon a food supply brought thousands of miles from the fertile fields of the temperate regions. Such apparent exceptions to the general rule are but genuine illustrations of the working out of the real principle involved; namely, the law of adaption.

In general, commercial enterprise is manifested along the lines of agriculture, manufacturing, mining and commerce. What effect has the physical geography of the world upon these forms of human activity?

The prime requisite for an agricultural region is a fertile soil. From what is such a soil made? How is it made? How has it been transported? Every one of these questions belongs to the realm of physical geography. If the student is able to answer them, he is also able to determine the fertility of the soil in any given locality. The soil does not alone, however, make an agricultural region. Climate, including heat and moisture, must render assistance. Though as a matter of poetry, "The wind bloweth where it listeth, and we may hear the sound thereof but cannot tell whence it cometh or whither it goeth": still, as a matter of

modern science there is little unknown about either the origin or the course of the winds. The child who has acquired even a rudimentary knowledge of air currents, and knows the simple laws governing evaporation and precipitation, may determine from the relief form of a continent the approximate rainfall in any given locality, and thereby decide for himself whether a certain region has the necessary conditions to make it a good agricultural district. Without this knowledge of nature's laws he must depend entirely upon his memory in his efforts to locate the farming lands of the world. With this knowledge he sees that agricultural geography grows out of physical geography and is dependent thereon.

When manufacturing had its origin, water was the chief power used in driving machinery. Even yet, owing to its cheapness, it is retained in service wherever possible. The older manufacturing districts are, therefore, situated upon rapid rivers, at points where there is sufficient fall to generate power. Only in the last years of the present century have steam and electricity made it possible to establish manufacturing plants remote from running water. Acting upon the general principle involved, settlers going into a new country have seized upon water-power sites, and around such places there have quickly sprung up villages, towns and cities.

Why do certain rivers creep lazily and wearily toward the sea, while others plunge headlong toward the ocean with the strength of a thousand horses in their torrents? This is a question for the student of physical

geography; yet upon its answer depends in a large measure the ability of a student to locate, irrespective of the words of the text, the manufacturing districts of a country. Thus taught, even a young philosopher can determine why New England had its millions of busy spindles, while upon the banks of the lower Mississippi not a single mill stood among the whitened fields of cotton.

Has physical geography any message for the boy or girl who is trying to learn about the mineral regions of the world? At no other point in the whole range of the science is the answer more explicit. Geology, the foster parent of physical geography, teaches the student to read the history of this old world in the strata which compose the leaves in her book. In some places these strata lie unsoiled and smooth as they were originally placed, but in others they are crumpled and torn, exposing the ragged edges of many a deep-laid leaf to the inspection of man. At such places, minerals which were once deposited far below the surface are brought within the reach of the drill, the pick and the shovel.

How was coal made? What are the interrelations between coal, petroleum and natural gas? What agencies have been at work to transform soft coal into hard coal? Surely the pupil who can answer these questions will have little difficulty in locating the coal, oil and gas fields of the world.

The average teacher who instructs her pupils as to the locality, size and leading enterprises of any given city takes it for granted that she has discharged her

whole duty. It is quite possible, however, that there is a better way which should be adopted. These great centers of population usually have their origin in one of four causes ; they are educational centers, political centers, manufacturing centers or trade centers. Ann Arbor is an illustration of the first, Washington of the second, Lowell of the third and New Orleans of the fourth class. Occasionally a city, as Boston, has its origin in two or three of the above causes. Every great producing region has its distinct trade center conveniently situated for discharging the business pertaining to that region. Odessa, Rio de Janeiro, Minneapolis, are illustrations of this point. Occasionally the same city is so situated that it can readily serve as a trade center for two, three, or even four distinct producing regions. Chicago is an illustration of such a city. When thus favored a city must needs grow rapidly.

There are two distinct kinds of transportation — land and water. Cities which owe their importance to the fact that they serve as freight depots for vast regions must be situated at points favorable to either one or both kinds of transportation. When a city is located so that it is a necessary center for both land and water transportation, is furthermore a great manufacturing center, is still further a collecting and distributing point for several great producing regions, and becomes finally a distinct educational center,—that city must of necessity grow beyond all precedent. Chicago is the only illustration of such a metropolis.

It is interesting to note that every important seaport

is located upon a good harbor. If the seaport in question is an old one, the water upon which it is situated is a good natural harbor. Venice illustrates this truth. If, however, the city is a modern one, the harbor may be artificial. Such is the harbor at Galveston. In many places man has supplemented the work of Nature so that a harbor which was originally slightly defective has been made ideal. Such is New York harbor.

Do not the above remarks suggest a more perfect way for teachers to teach the geography of cities? The vital question is not, "Where is a city?" but, "Why is it in that place?" Pupils taught by this latter method cannot but be impressed with the fact that the great centers of the world's population have not been located by chance, but are determined by underlying principles whose operation may be known to all.

Having by the above process determined the location of the leading cities of any given country, the next point in studying the commercial geography is to discuss their means of communication. If it is true that the chief factors in determining the site of a city are physical forces, it is also true, even to a greater extent, that the lines of communication between those cities are similarly decided upon. When the Great Lakes were to be connected with the Hudson river by canal, the first point to be decided was the location of a natural water course between Buffalo and Albany. Where shall an oceanic canal be located for the purpose of connecting the waters of the Atlantic with the waters of the Pacific? Panama was once chosen

because the isthmus was the narrowest and the mountains the lowest at this point. Millions of dollars were expended before it was found that the route was impracticable. Nicaragua is now the favorite route, because the physical geography of that region makes the task of the engineer less difficult, even though the length of the canal is greater. When it became necessary to connect by rail Denver with San Francisco, the engineers sought carefully some mountain pass where for ages water has been steadily at work cutting a defile between the peaks, and making possible the construction of a railroad. When a trunk line is to be laid between Chicago and New York, every inch of ground is carefully inspected, in order that all possible advantage may be taken of water courses, ravines and valleys, thereby finally locating the route in such a place that the gradients shall be least in that direction in which the heaviest freight is drawn. Nor are we confined to modern history for illustrations of the principle under discussion. The great commercial routes of the old world were along lines of least resistance, whether they traversed the burning sands of Arabia or skirted the coasts of Europe. When the invention of the mariner's compass removed hitherto insurmountable obstacles and changed the lines of least resistance, Venice, Pisa and Genoa felt the uplift of a new commercial life. Still later, when the routes were again changed, these commercial centers of the middle ages became mere memories in the business world.

Apply the foregoing general principles to the study of the settlement of our own country. From the time

when the first settlers pushed up the creeks and rivers which empty into the Atlantic, building their stockades and clearing the ground, to the time when their descendants, imbued with the same spirit, planted the most recent settlements upon our western coast, advancing civilization has followed the natural roadways of the continent, and its star has in turn stood above each favored spot where kind Nature made it possible for man to make "the desert blossom as the rose." The first settlers followed water courses or picked their trail around morasses, avoided steep hills and finally settled in those localities where the struggle for existence would be least severe. A drive along the original turnpikes which cross the southern part of Michigan cannot but impress this truth upon even a casual observer. When Marcus Whitman, with his peck of seed wheat and old red wagon, picked his way through the mountain fastnesses of the Rockies that he might settle in the fertile plains of the Oregon, and thereby take possession of the land which should ultimately become two mighty states, he illustrated the same general law. When the "Forty-niners," with their prairie schooners, wound slowly over the trackless prairies and then climbed wearily through the safest mountain gorges that they might win a fortune and establish a state, they, too, illustrated this same general law. Indeed, the student of history who would rightly study the gradual settlement of the United States must study it from the standpoint of physical geography.

Enough has been said to show that Frye has many reasons for claiming that the vital geography, the polit-

ical geography and the commercial geography of the world grow out of, and are dependent upon, the physical geography of the world. It remains for us in subsequent chapters to see how this truth is brought out and developed in the two books which this author has written.

CHAPTER II.

Frye's Primary Geography. Pages 1–17.

SOME GEOGRAPHY MAXIMS.

THE casual reader will notice at once a marked difference between the opening pages of this book and the corresponding pages of other primary geographies. It has been customary in times past for authors of geographies to begin with definitions of various land forms and water forms. Search as best you can through the first seventeen pages of Frye's book, and you do not find a single definition. This much is apparent to all. The vital difference is not, however, so apparent. To discover this, one must look closer.

Two distinct forms of reasoning have been given to the world — the deductive and the inductive. In accordance with the former the reasoner proceeds from general truths to individual facts. In accordance with the latter the reasoner begins with individual facts and reaches general conclusions. The deductive system of reasoning was formulated by Aristotle, and for 1500 years constituted the only recognized system. Even yet it is used exclusively in pure mathematics. While this system held universal sway science stood still, or if it advanced, it was almost sure to reach incorrect conclusions. Finally Bacon systematized the inductive

form of reasoning and established the truth that observation, the gathering of data and the examination of individual facts should precede the enunciation of a general truth. Final conclusions were thus made to depend upon actual facts ; whereas in times past the actual facts were distorted to harmonize with the general conclusions. The immediate effect of the Baconian or inductive system of reasoning upon all branches of science was marked. Chemistry, Physics, Botany, Medicine, Zoölogy, Physiology, Geology and Physical Geography were soon established upon a reasonable basis. Having been thus established, they offered a most fruitful field for investigation and research. The result was most astounding. These sciences forged ahead more within the next few years than they had in all the preceding centuries.

Mr. Frye in these first pages of his Primary book has simply applied the inductive process of reasoning to a beginners' geography. He aims to reason from individual facts, gathered by observation, to general conclusions, and moves continually from the concrete to the abstract. In this way he establishes several interesting geographical principles. In thus establishing them he trains not merely the child's memory, but his reasoning powers as well.

There are two kinds of observation : observation of nature *per se*, and observation of pictures or models of nature. The former is always best when it can be rightly directed ; the latter is often necessary in the study of geography, because many forms of land and water are not to be found in the vicinity of the school.

Frye recognizes both kinds of observation. He supplements the first by an abundance of well-selected pictures, illustrating the phenomena under discussion. No teacher can use this book successfully unless she realizes the importance of both kinds of observation. She must frequently take her class to observe gravel banks, slopes, divides, valleys, basins, deltas, water courses and vegetation to be found within walking distance of her school ; and also train her children to study illustrations of other phenomena not located thus conveniently. In doing this work she must exercise the greatest care that her pupils are taught how to observe and what to observe. The importance of these lessons is not confined to the geography. The power of observing carefully (such power must always precede the habit of observing carefully) is a necessary foundation for all science training. More than this, there is no other power which the teacher can cultivate in her pupils which enters more vitally into their ultimate success as men and women. He who observes accurately and compares carefully has a power which goes far toward making his success assured.

Let us now observe how Mr. Frye applies the inductive system of reasoning to geography. In his first lesson he makes what the lawyer would term "an opening statement," in which he announces that which he expects to show in the course of the book. Passing on to Lesson 2, he directs the observation of teacher and pupils along certain lines. In Lesson 3 the observation work is continued with this difference — in the second lesson that which is observed is nature

itself; in the third it is pictures of nature. In the fourth lesson the pupils are led to think about some natural scenes which they beheld in times past, but which are not now before their eyes, either in actual form or as pictures. Then before the close of the lesson the first general geographical principle is enunciated; viz., that *slopes decide the direction of rivers, and by rivers we are able to find out the direction of slopes.* This is a simple, yet an important principle. Many pupils have, however, advanced to the age of maturity without recognizing this truth or using it in the study of maps. Having reached the general conclusion, it will be well to permit pupils to apply the same to the examination of such maps as those found on pages 9, 32, 42 and 46. In fact they should make constant use of this and succeeding general principles as soon as those principles are developed. By thus using these principles they will learn to recognize their importance, and will realize that they constitute the alphabet of geography. It will be well, at this point, to make one general statement which pertains to the working out not merely of the first geographical principle, but also to those which follow. Teachers should not confine themselves to the exact questions asked in the book. The observation work, both as it pertains to nature and to pictures, should be broader and more extensive than is there specified. The teacher must recognize the general truth which she wishes to bring out, and direct the observation accordingly. Moreover, the immediate vicinity of the school may give opportunity for much more extended observation

of nature than even Mr. Frye suggests. You will also be able to illustrate many points by pictures selected from other text-books and from general collections.

With the fifth lesson the author takes up a different thought. He here directs pupil and teacher to make certain experiments. What is an experiment? Simply a question asked of Nature. To learn the answer one must observe closely. At the beginning of the sixth lesson the author directs certain lines of observation work, and by the time the last paragraphs are reached the pupil is ready to draw his second conclusion; viz., *Coarser soil is found near the heads of streams, while the finest soil is in the vicinity of the outlet.* Let him apply this principle to the discussion of the upper picture on page 2, and the two pictures on page 5. He will be able to see that this same principle is applicable to the largest river basins in the world.

In Lesson 7 the author directs another line of experimentation. In Lesson 8 the pupil is led to observe the effect of water upon vegetation, and is taught the third general principle; viz., *Water is necessary to all forms of vegetable life.*

In Lesson 9 the author directs some new experiments, with an entirely different object in view. He follows these in Lesson 10 with observation work from nature which is within the reach of every pupil. This is continued in the early part of Lesson 11. Finally, before the close of that lesson, he announces the fourth general principle; viz., *Deltas are formed from soil worn off from high land and deposited where slow streams empty into still water.* This is one of the most

important geographical principles which the student will meet. Notice how the conclusion has been established. The author begins with the observation of seemingly trivial forces at work in the vicinity of any schoolhouse, and step by step leads up to the establishment of a general principle which accounts for the formation of some of the most extensive and fertile tracts in the world. Be sure to let the pupil make use of this principle. Teach him to recognize a delta wherever he sees it, both in his own observation of nature and in the examination of pictures and maps. By contrast let him observe also what rivers will not form deltas. Even now he may compare the outlets of the Columbia and the Mississippi, the Ganges and the St. Lawrence, the Indus and the Colorado, the Rhine and the Danube, the Congo and the Nile.

It will be well for the pupil now to combine principles two, three and four, and determine for himself the soil in the deltas and also whether that soil is calculated to support vegetation. The pupil has not thus far had anything relative to the effect of temperature upon vegetation, and consequently the teacher will be obliged to direct his reasoning so that he may not form erroneous conclusions.

With Lesson 12 the author begins another line of experiments by which he seeks to place before the pupil the different conditions under which evaporation and precipitation take place. In Lesson 13 he leads the child to see these same forces at work in nature itself. The conditions of the various forms of precipitation are set forth. All these are drawn from infor-

mation already possessed by the pupil. In Lesson 14 the child is taught to observe at least two sources of streams, and in Lesson 15 the fifth general principle is enunciated; viz., *By means of evaporation and precipitation the rivers are supplied with water.*

In the development of the next general principle it is suggested that Lesson 17 follow immediately after Lesson 19. Lesson 16 is an observation lesson. So are Lessons 18 and 19. Their examination, taken in the order suggested, will lead the pupil from local to universal facts and will include both the examination of nature itself and pictorial representations of nature. In Lesson 17 the pupil establishes his sixth general conclusion; namely, *By means of divides river basins and systems are formed.* Review the first principle in connection with the sixth. Make practical application of this general principle in the study of maps on pages 9, 32, 36, 42, 46, 50 and 91. Then return to the map on page 8 and train the pupil to observe that between adjacent branches of the Mississippi system there must be a local divide. Every such branch, therefore, having a divide on each side of it, marks a distinct valley. Pupils should be taught to distinguish carefully between local slopes and general slopes; the main stream and its chief branches revealing the latter, while the smaller branches determine the former. A study of the Tennessee and the Cumberland rivers will be interesting in this connection. It will be well to ask the children to locate the lowest ground in any great river system, and to point out and describe the general slopes which approach that lowest ground; then to see how

these general slopes are in turn cut by other valleys, in which the slopes are, in all probability, at right angles to the main slope ; how these second valleys may be in turn cut by still smaller valleys, and these again traversed by other valleys, until finally the branches have been traced back to the original brooks which flow between the local hills. Remember that all these can be read from the map on page 8, if the other maps have been studied as suggested. The teacher must, however, make use of the wonderful imagination which every child possesses. The white page before him, covered with a few wiggly black lines, will then have a meaning which otherwise it cannot possess. Hills and valleys will come forth, slopes and divides be a reality, and the whole surface of any map become a book as legible and entertaining as a fairy tale.

With Lesson 20 the author begins another series of experiments. He follows this in Lessons 21 and 22 with a series of observations. These experiments and observations have a definite purpose. They serve to lead the pupil out from the individual to the general. The experiments and observations cover both nature itself and pictures. Following these directions the pupil is able to ascertain the seventh geographical principle, which is : *Wind, frost and running water are the chief agencies in pulverizing rock and wearing down mountains.* Having determined this principle, the pupil should make practical application of it in the discussion of local geographical features. He should realize that these forces are at work transforming the surface of the

ground in his immediate neighborhood. Such observation will assist the pupil in appreciating the fact that these general principles which he has discovered are principles which are now operating in actual nature and not merely something which the author has seen fit to place in the text-book.

The general principle which the author seeks to develop in Lessons 23 and 24 is closely connected with the seventh principle. The means of reaching the final conclusion are the same as have been heretofore noticed; namely, by observation and experiment, to proceed from the examination of individual facts to the general conclusion. In Lessons 20, 21 and 22 the pupil was led to discover the great agencies which Nature uses in wearing down the mountains. In Lessons 23 and 24 he notes the eighth general principle, namely: *Running water is the chief agency in transporting material from the mountain regions to the lowlands, and most of the lowlands of the world have been thus made.* Pupils should now combine principles seven and eight in the discussion of such regions as the Colorado cañon, Niagara gorge, the Nile valley, the Mississippi valley and the Ganges valley. While it is true that pupils do not yet know the geographical location of these regions, neither have they had any instruction relative to the names of the different continents and divisions; it is equally true that if the teacher will turn to the maps the pupils will easily see how the seventh and eighth principles enable one to understand the necessary geographical conditions of these places.

Thus far the general principles that have been devel-

oped are those which largely govern the building up of the inside of a continent. Very little has been given about shaping its margin. The only place where anything has been said directly about shore lines is in connection with the formation of deltas at mouths of rivers. In Lessons 25 and 26, by skillful questioning and by carefully directed observation, the author establishes the ninth geographical principle: *The chief agency in shaping shore forms is the ocean.* He shows how the waves, surf and currents act differently upon different kinds of soil, fashioning in one place a bold bluff, in another a shelving beach; how a harbor is cut here and an unbroken shore line is left there.

The nine principles re-stated in order of their development are:—

1. Slopes decide the direction of rivers, and by rivers we are able to find out the direction of slopes.

2. Coarser soil is found near the heads of streams, while the finest soil is in the vicinity of the outlet.

3. Water is necessary to all forms of vegetable life.

4. Deltas are formed from soil worn off from high land and deposited where slow streams empty into still water.

5. By means of evaporation and precipitation the rivers are supplied with water.

6. By means of divides river basins and systems are formed.

7. Wind, frost and running water are the chief agencies in pulverizing rock and wearing down mountains.

8. Running water is the chief agency in transporting material from the mountain regions to the lowlands,

and most of the lowlands of the world have been thus made.

9. The chief agency in shaping shore forms is the ocean.

Every pupil should be thoroughly familiar with the above principles. He can no more understand the remaining pages of geography if he is in ignorance of them, than he can understand advanced mathematics if he is unacquainted with the fundamental operations in arithmetic. It is not sufficient that a pupil should memorize these principles (a parrot could do that); it is necessary that he should have the power of applying these principles to the discussion of the geography of any given locality which he may be studying. In all subsequent work teachers should recognize these principles and give the pupils abundant opportunity to make practical application of them in the daily work of the class-room. Pupils must be trained to see that these principles do not operate individually, but in unison. Often, in trying to understand the features of some locality, several or all of the principles must be used. The practice of thus applying the principles will assist in training the pupil's judgment and reason. This work will place the study of geography upon an entirely different basis than that heretofore occupied, and will entitle it to a much higher place in the school curriculum.

CHAPTER III.

Frye's Primary Geography. Pages 24–55.

THE PHYSICAL GEOGRAPHY OF THE WORLD.

THIS portion of the book is distinct and characteristic. At the time the book was written no other author had put forth anything like it. As Mr. Frye makes so much depend upon the physical geography of the world, it is safe to say that the work of these pages constitutes a most important undertaking in the study of geography. The teacher must here, if anywhere, enter into the spirit of the book. She must grasp the central thought of the author and work in harmony therewith. What is this central thought? Simply this: *The unity of the physical features of the earth.* To establish this, Mr. Frye first discusses the earth as a unit, showing that there is a world ridge traversing the globe and having its uniform divides and slopes. The pupil is led to notice the similarity among the inside slopes and the similarity among the outside slopes of this ridge. The relation of this ridge to the shallow and deep oceans is also brought out. In the discussion of this part of the book the teacher must supplement the text with oral instruction in certain particulars; the child must be taught the names of the grand continents even before those names appear in the book.

It is not the intention of the author to dwell much, if any, upon details. This view of the earth is like that which a person upon the moon might obtain through a powerful telescope. To him the earth would be a unit, and to the child, in the study of the world ridge, it is to be a unit traversed by one great elevation.

Before taking up the study of the continents, as given on page 31, it will be well for the teacher to bring out a few of the salient features in the chapter on Heat, Wind and Rain, begun on page 75. A pupil at this point should know the approximate location of the belts of heat. He should know that heated air rises and that cool air rushes in to take its place; that this, coupled with the rotary motion of the earth, causes the Trade Winds, which blow constantly from the east over a region of the earth extending each side of the equator nearly one third the distance to the poles. He should know that water is evaporated from wet surfaces; that the amount of evaporation is increased by increasing the temperature and by setting the air in motion; that warm air will carry more moisture than cold air; that the effect of sufficiently cooling the air is to cause precipitation; that the chief forms of precipitation are fog, rain and snow; that the interposition of a range of mountains in the path of a warm, wet wind invariably causes heavy rainfall on the windward side of those mountains, while the wind which blows down from the summit upon the leeward side of the mountains is a drying wind.

In attempting to establish the above facts with refer-

ence to heat, wind and rain, it will be well to avoid scientific technicalities. Make the lesson as simple as possible, but be sure that the pupil knows these facts. Then, having learned them, be sure that he makes daily use of these truths in his study of the physical geography of the different continents. Knowing these few rudimentary principles, he will grow to determine, in a large measure without the help of teacher or text-book, the rainfall and consequent river system of each continent.

It is well to observe the order in which Frye takes up the different continents in his study of the physical geography of the world. This order is different in the Primary and Complete Geographies. Moreover, it is different from the order in which he takes them up when he comes to discuss the political and commercial geography of the world. There must be some reason for the arrangement he adopts. The continents, in the "Primary Geography," are studied in the order of their increasing difficulty. The simplest and most typical continent is South America. It therefore comes first. Then the others are discussed in the following order: North America, Asia, Europe, Africa and Australia. Note further that these continents are arranged in three natural pairs; the two Americas constituting the first. In both, the continental outlines are evidently triangular, with the apexes pointing toward the south. The main and secondary axes of the continents occupy similar positions and extend in corresponding directions, while the interior of each continent is a great fertile plain. In the second pair

of continents, Asia and Europe, the main axes extend in an easterly and westerly direction, and the secondary axis is in each case north of the primary axis and parallel with it. From each of these two continents three great plateaus project to the south in the form of peninsulas; while the lowlands of both continents slope gradually toward the Arctic ocean. The third pair of continents, Africa and Australia, are also similar — not so much in their outline as in the fact that the great mountain ranges of these continents follow quite closely the coast line, leaving as the interior of each an elevated, arid plateau.

Frye discusses the continents in a uniform manner, which may be roughly outlined as follows:

1. Skeleton.
2. Flesh.
3. Circulating System.
4. Shore Forms.

It is not meant that a teacher can place this outline upon the board when she comes to the study of any given continent, and from it secure good work on the part of her pupils. The outline, however, not only covers the topics developed by Frye, but also the order in which they are discussed. For our convenience it may be necessary to examine this outline more in detail.

By the skeleton of a continent is meant the relief forms of that continent, the primary and secondary axes and the arrangement of the plateaus. Upon this skeleton the flesh of the continent, that is, the lowland, is placed. (Make use of the seventh and eighth geo-

graphical principles.) Having thus determined the highlands and lowlands, we are next to discuss the circulating system; but before the rivers can be decided we must know the rainfall of a continent. In order to know this we must take up the position of the heat belts and the prevailing winds. (Revert to fifth geographical principle.) Having found out where the precipitation takes place and the form in which it comes, the pupil will determine the river systems of a continent. (At this place make use of the first and sixth geographical principles.) Having mastered these three general topics, skeleton, flesh and circulating system, the class can advance to the discussion of shore forms, and see how they have been shaped by the ocean in a manner either to promote or retard commerce. (Make application of the fourth and eighth principles.) This is the order in which Mr. Frye discusses each continent in detail.

When a new continent is taken up, the teacher should compare that continent with the preceding one. This is a most important point. Such comparisons train judgment and give the pupil data from which he may reason. These comparisons should bring out not only the points of resemblance but the points of difference. By such means the central thought of this portion of the book will be made clear. The pupil will see for himself the unity which pervades the physical geography of the earth, but will see in that unity a variety which is instructive and interesting.

In our lessons in reading and arithmetic we are very careful to give what are designated as development

lessons, by which we pave the way for that which is to come from the study of the text. From our broader experience we put the pupil in a position so that his mind will be in a receptive attitude; thus enabling him to take up the work of the study period in a way that will give him better returns for his labor. The development lesson is even more necessary in geography than in either reading or arithmetic. When a new continent is taken up, turn to the physical map as given in the book, or, what is better, a physical wall map, hung before the pupils. Give a development lesson upon the physical geography of the continent, in which the pupils will be led to see that they can read from the map nearly every important geographical fact bearing upon the study. In truth, as the student grows older, he will perceive, if rightly taught, that the only things which he cannot read from the map itself are the names which man has used to designate the different regions. There is no law governing these; they are purely arbitrary.

CHAPTER IV.

Frye's Primary Geography. Pages 55–86.

THE VITAL GEOGRAPHY OF THE WORLD.

It is quite possible that the title given to this chapter may not be the best that could have been selected, and therefore it may be necessary to explain, in a word, what is meant by the term "vital geography." As here used, it means simply the geography of the animal and vegetable world. For the purposes of this discussion man will be classed among the other animals. In thus classifying man we shall not undertake to treat of his industrial and political progress, but shall consider him strictly from an ethnological standpoint.

Possibly the first educational body to lay stress upon vital geography was that branch of the National Educational Association which gave us the Report of the Committee of Ten. They emphasized what is commonly called the "Humanistic side" of geography. Before that report was issued Mr. Frye had, however, written his text-books in which the broad principle was laid down, if not in so many words, at least by implication, that, in a large measure, the vital geography of the world grows out of, and is dependent upon, the physical geography of the world.

Though treating such a general principle, Mr. Frye

realized that he was writing for children, and that abstract discussions would be utterly inadequate. He therefore sought to establish his general conclusion by such simple reasoning that even a child can grasp it.

This author introduces the children of America to the children in the different parts of the earth. His plan is much the same as that followed by Jane Andrews in "Seven Little Sisters" and "Each and All." The publishers have, however, made this text differ from the Andrews texts in several important particulars, the most prominent of which is the great number of excellent illustrations found in the geography.

The chapter upon the people can be considered a series of reading lessons, and should be supplemented by corresponding lessons from such books as Butterworth's "Journeys," "Rollo's Tours" and Jane Andrews's stories. The wide-awake teacher will bring to the class many other books which will render real assistance in this work. If, however, the lesson stops simply with interesting the class with stories of the little people in other parts of the world, the real and vital question will be lost. Every pupil should see that the physical surroundings of Tibbu, Chuglu, Hans, Wilhelm, the Arab children, the Indian children, the Lapp children, the Malay children, the Japanese children and the Chinese children are the chief factors in determining the kind of a home they live in, the food they eat, the clothing they wear, the games they play, the progress they make and the occupations their parents pursue. The child who grasps this great truth will have the foundation upon which to build a substantial super-

structure in support of the proposition that physical environment determines in a large measure the position any nation takes in the history of the world.

Following the chapter upon people is a chapter upon Heat, Wind and Rain. It has been suggested that a few of the principles involved in this latter chapter should be brought out and established before discussing the physical geography of a continent. This seemed necessary in order that pupils might correctly understand the drainage of the various grand divisions. The work of this chapter must now be examined a second time, but for a different purpose. Rightly studied a second time, this portion of the book will give the necessary data from which to examine the flora and fauna of the world. One of the strongest features in Mr. Frye's treatment of "Heat, Wind and Rain" is the careful way in which he avoids scientific technicalities. A few great truths are brought out, but they are established without either laborious reasoning or the phraseology of science. The teacher should profit by the example so plainly set by the author. Children who have reached this stage in their work are unable to enter more deeply into the subject. Rudimentary facts concerning heat, wind and rain are, however, necessary for the study of the animal and vegetable life of the world. The way in which the earth is heated, the general causes for different degrees of temperature at different portions of the earth, the various heat belts, moisture as a necessary condition for fertile soil, the interrelation of wind and rain and the causes of seasons and their changes are the principles which

should be established at this point in the pupil's progress. If these principles are understood, the class may safely advance to the discussion of plant and animal life.

In Lesson 109 Mr. Frye gives the key to this portion of the work. Note the two following sentences: "Every plant grows best where it has the kind of soil and the amount of water and heat that it needs." "All over the earth plants search out the soil, heat and moisture that best suit their needs." Here is the statement of the doctrine of adaptation or, as it has been previously put, the fact that the vegetable life of the world grows out of, and is dependent upon, the physical geography of the world. These two statements, if given to the pupils without illustrations, will fail to convey the real meaning. Undoubtedly, Lesson 109 is sufficient for a recitation. Still it can be read in three minutes. The teacher must exemplify the truth of the two statements made. To be sure, the author gives several examples. These are, however, but hints; the teacher must have in mind many other illustrations, not merely of a local character, but such as will lead the child from the contemplation of local vegetation to the vegetation of the great heat belts. Let him see that the principle involved is one and the same, whether we consider the pussy willow growing on the margin of a local stream or the stunted growth within the Arctic circle.

In showing how plants search out the soil, heat and moisture that best suit their needs, the teacher has an opportunity to draw abundantly from the works of such

teachers as Agassiz and Darwin. Even at this point children can get a glimpse of that quiet but constant and intense struggle throughout the vegetable world which for ages past, and during the unending present, gives us "the survival of the fittest." He who, without ostentation, without pedantry, but with simplicity and with candor, can teach at this time such an important truth, has many of the elements of a great teacher.

Following Lesson 109 are four lessons in which Mr. Frye gives us the names of the plants growing in each of the heat belts. It would be quite possible in this connection to require the child to memorize the complete classified list of all plants mentioned. Such a system would, however, fail utterly of the real intent of the author. Notice that under the discussion of each distinct belt there is a statement of the physical conditions of that belt with reference to heat and moisture. For example, in Lesson 110 we find this assertion: "This belt (the Hot Belt) has a hot or a warm season all the year, with plenty of rain. The hot belt is very rich in plant life." Then follows the enumeration of a number of plants which grow in the hot belt. Group these all together and you have the general fact that the important vegetable life of this belt is that which produces fruit, which, without being cooked, serves adequately as food.

In Lesson 111 we are informed that the physical conditions of the warm belts are similar to those in the hot belt, with the exception that in the former there are long, hot summers and short, cool winters. We would naturally expect the vegetable life to be

similar to that of the hot belt. Though this similarity exists, there is, however, a difference. The fruits are not those which are calculated to sustain life, but to add to its pleasure. We here meet for the first time that cereal, rice, which will grow nearest the equator. Moreover, as there are short, cool winters in the warm belt, Nature provides a plant which will furnish material for clothing. This is the home of the cotton.

On each side of the warm belts are cool belts. Mr. Frye tells us that the hot and cool seasons are of about equal length. Note the characteristic vegetation. This is the home of the grass, the cereals and the forest. Proceeding in our journey toward the poles, we come next to the final heat belts, in which the summers are short and the winters long. The minimum growing season necessitates the most stunted forms of vegetation. Food plants are unknown.

In the chapter on animals the same general principles are developed as in the chapter on plants. The animal life depends upon its environment just as truly as does the vegetable life. The dependence is not, however, so absolute, owing to the fact that animals have the power of locomotion and can move from place to place. This fact makes it impossible to classify them in regard to heat belts as accurately as we do vegetable life. This is especially true with reference to birds, which can migrate from one region to another. Mr. Frye recognizes these truths in that, while he devotes a separate lesson to the plants of each heat belt, he groups the animals of the heat belts in one section. Though animals have the power of locomo-

tion, there are many barriers which they cannot cross. Where such barriers intervene the animal life on the different sides of the barrier is distinct. If animals are left free to migrate, they will ultimately settle in that region which is best suited for their development. Here they will remain until the physical conditions change or advancing civilization drives them to new fields.

Though in the vegetable life there is ever a struggle to determine "The survival of the fittest," this struggle becomes a mere skirmish when compared with the contest going on in the animal world to determine what forms of animal life shall survive. To the plants food is brought by the air, soil and moisture. If it is not thus tendered them, they die and a new form of vegetation springs up. Not so among the animals. Mr. Frye aptly says: "All around us there is a struggle for food." The animals must struggle for their own food. Kindly Nature does not offer it to them from an open hand. In the effort to obtain the necessaries of life they fight continuously and ultimately die. All along the scale of animal life, from the lowest to the highest, the great struggle is for something to eat. Nature helps each by furnishing organs especially adapted as weapons in this warfare.

The above facts show why Mr. Frye should give the lessons on "The Teeth, Claws and Homes of Animals." Note the pictures on page 83. The elephant's trunk is calculated to help him get his proper food. The giraffe has a long neck, which enables him to reach the branches of trees. The woodpecker has a

stiff, hard bill with which he picks holes into the trunks of trees. The duck has a shovel-shaped bill, just fitted for digging in the mud. The ant-eater has a nose and tongue suited to his manner of getting food. The eagle's beak is well calculated to tear to pieces his food, while that of the finch is naturally shaped for cracking seeds. The humming bird has a bill with which he can draw nectar from the deepest flower cup. The hog can root in the ground. The tiger's paws are obviously adapted for springing, catching and scratching. The duck's feet are just the kind to enable him to walk best in the mud, while those of the camel have the soft, yielding pads which make it possible for that animal to travel over the sands of the desert. The long, bare legs of the heron are such that that bird can wade in deep water in search of food. The neck and bill of this same bird are of the right shape and length to work in harmony with the legs. The ostrich's feet and legs are well adapted to running, while the eagle's talons are so strong and firm that they can carry food which the beak will afterward tear to pieces. The clean, hard hoofs of the horse are the acme of perfection, their present form having been reached through ages of development.

Keeping in mind the above facts, we shall readily see the basis upon which Mr. Frye broadly classifies the animal life of the various regions of the world. In the hot belt the dominant animal life is carnivorous, with all its inherited ferocity. In the temperate regions the dominant animal life is herbivorous and is found in greatest abundance where pasture lands are best. In

the polar regions, where vegetation is reduced to a minimum, the animal life is again carnivorous, but is largely aquatic or semi-aquatic.

A final thought is necessary with reference to the relation of animal and vegetable life to human food. While animal life is most abundant in the tropics, the flesh of animals living in the hot belt is not good food for man, even if he felt disposed to eat it. In the region of the equator man's food consists almost entirely of fruits and vegetables. As we move toward the polar regions cereals take the place of some of the fruits, and as we go still farther men depend more upon meat and less upon vegetables for sustenance. Finally, as we approach the poles, the flesh of animals is used entirely. It will thus be seen that the maximum amount of food supply is given us by the vegetable life in the tropics, and the minimum amount in the polar regions; while, on the other hand, the animal life gives us the maximum amount in the polar regions and the minimum amount in the tropics. In the temperate regions these two sources of food are about evenly balanced and man is best nourished.

CHAPTER V.

Frye's Primary Geography. Pages 86–136.

THE POLITICAL AND COMMERCIAL GEOGRAPHY OF THE WORLD.

THE next distinct portion of the book is that which begins on page 86 and continues throughout the remainder of the text. This portion treats of the political and commercial geography of the world. In teaching these subjects Mr. Frye would have it constantly kept in mind that the political geography and commercial geography of the world grow out of, and are dependent upon, the physical geography of the world. Notice how he introduces on page 91 a relief map of the United States, in order that it may be compared with the political map found on the opposite page, and the product maps found on the following pages. Every one of these maps should be measured by the relief map. Much benefit will be obtained by superimposing each in turn upon the relief map. This is another recurrence of the foundation principle of the book. Some teachers have thought that these branches of geography should be brought out immediately after the discussion of the physical geography of each continent. Such, however, is not Mr. Frye's plan. He keeps constantly in mind that the earth must be studied as a unit. First, he discusses

the world ridge; second, the physical geography of the earth; third, the vital geography of the earth. Now he takes up the business and commercial geography. In each of these subdivisions the pupil is led to see that subdivision in its relations, not merely to one continent, however large that continent may be, but to the entire world. It is, therefore, fitting that the author should discuss the relation man bears to the earth as a unit. The only place where the book deviates from this general underlying principle is from page 129 to page 136, where, in an appendix written by another author, a new plan of treatment is given for the geography of certain groups of states in order to give more details. It will, however, be noticed that even this appendix is to be studied only after the book has in reality been completed. This appendix is, moreover, partially justified by the fact that many pupils drop out of school before studying the larger book, wherein they will find the more explicit geography of that portion of the United States in which they reside. If all children were sure to study the "Complete Geography," this appendix, treating of local geography, might safely be omitted.

In that portion of the book now under consideration the child should get his principal instruction in the geography of location. Here is where some attention must be given to the old-fashioned drill. Pupils should not be allowed to pass through the study of geography without learning definitely the location of the most prominent places on the surface of the earth. Such a knowledge is of inestimable benefit in all subsequent reading. In the examination of the maps given by

Mr. Frye the teacher will be struck with the fact that the author gives names of but a few places. Almost without exception those found in the "Primary Geography" should be learned by pupils. If they know the location of these places, their geography of location will be sufficiently accurate for pupils of this grade.

It is to be observed that in the discussion of the political and commercial geography of the world Mr. Frye takes up the study of the continents in an entirely different order from that followed when discussing the physical geography. Why this change? Before, as was noticed, the order is the order of increasing complexity. Now the order is the order of diminishing business and political importance as measured by the standard of a citizen of the United States. Notice the truth of this statement in the following arrangement of grand divisions: United States, North America, South America, Europe, Asia, Africa and Australia. Some may fancy that Europe should precede South America, but possibly, in placing the continents in the order selected, Mr. Frye has grasped more accurately than these critics the real present and future business and political relations of the United States.

The way in which Mr. Frye treats the subject of "The People of the United States" is decidedly different from the way in which that topic is usually treated by geographers. A few writers of history have, however, approached the theme from practically the same standpoint. The average fifth grade pupil, in studying the distribution of people in the United States, discovers no laws governing that distribution, and the average

grammar grade pupil, in studying the gradual settlement and development of the United States, remains equally in ignorance of the underlying principles. Possibly writers have thought that these principles are either too unimportant or else too difficult. Such, however, is not the opinion of Mr. Frye. He sees in the distribution of population and in the gradual settlement of our country the same law which underlies the entire subject of geography. In his mind the physical geography of a country is the great determining force which decides all such questions. Adequately understanding this, the pupil is able to know why cities are located in some places and not in others, why population is more dense in some states than in others, and why settlers followed certain well-defined routes in their invasion of the New West. Preceding the establishment of canals and railroads, settlers followed the water courses through the forests of the Middle States; and these same water courses served as highways along which they shipped the products of their farms. Washington grasped this thought over a hundred years ago, when, in the absence of a natural water course connecting the head waters of the Ohio with the head waters of the Chesapeake, he sought to locate a canal between those points. He recognized this as the only way of keeping the great Mississippi valley from either founding an independent government or becoming a province of France or Spain. Similarly, he himself inspected a canal route between the Great Lakes and the Hudson river, hoping thereby to establish a means of communication between the valley of the Great Lakes and the Atlantic seaboard, and

thus unite the great Northwest to the Atlantic States by the ties of commercial interest. To his mind the physical geography of these regions was so important that it became a determining factor in maintaining the integrity of that country whose independence he had secured. His dreams were ultimately realized, even more fully than he expected.

Mr. Frye's method of presenting the business interests of the United States to a fifth grade child is unique. Notice how he takes up each great product in turn, giving a map illustrating the locality especially adapted for this product. He gives the physical conditions necessary for producing each great staple. As a means of assisting the pupil in determining these physical conditions it will be well to require the child, as previously suggested, to superimpose each of these maps upon the physical map of the United States. He will thus learn why the cotton belt is in one region, the corn belt in another and the wheat belt in a third. Take next in connection with each of these maps the paragraph found on page 100, which reads as follows: "Every producing region needs one or more shipping points. These become centers of trade. They should be within easy reach of all parts of the region, and should connect by water, rail or other route with the markets of the world." Require the pupil to determine the centers of trade for each region studied. He will, by this process, learn the reason for the location of cities. It is not enough, however, to know where cotton is raised, how and where it is collected. The pupil must know where the cotton is manufactured into cloth. This will establish the loca-

tion not only of New Orleans and Galveston but of Boston, Lowell and Manchester as well. Having discovered the collecting and manufacturing centers, the next question is, "What are the routes of trade between these points?" Nor is the inquiry yet complete. The next natural question that arises is, "What are the markets for the manufactured cotton?" When the child has determined this question and the routes of trade between the manufacturing centers and these markets, he has completed the geography of cotton. In a similar way let him discuss wool, wheat, forests, beef, cattle, coal and iron. True, in some of these the manufacturing centers are not so concentrated as in the case of cotton, but they are nevertheless quite distinctly marked. The cities where cattle and hogs are changed to beef and pork can be definitely located. The interrelation of coal and iron will determine the great smelting cities of the world. It will thus be seen that whenever a producing area is discussed its physical conditions must be first determined, then the area over which these conditions prevail, then the collecting and distributing depots for the area, then the manufacturing centers, then the routes of trade between the collecting depots and the manufacturing centers, then the markets for the finished product, then the routes of trade between the manufacturing centers and the markets, and, finally, the interrelation between certain great departments of business enterprise.

It is suggested that in this connection it will be interesting and instructive to allow the pupil to superimpose one product map upon another, in order that

he may determine for himself what regions of the country depend for their prosperity upon simply one line of business, and what regions have diversified occupations. Our fifth grade boy will then be able to decide what localities are least liable to periods of business depression.

The class which has followed the study of the geography of the United States according to the plans suggested will have learned the reason for every great city in the country and the principal land and water routes connecting these cities. This plan, faithfully carried out, will determine quite largely the answer to that perplexing question which often arises in the mind of the teacher, "What cities shall I require my class to memorize?" Possibly the only additional cities which the pupils should learn are those which owe their importance to political or educational interests. Every fifth grade child should know the capital of every state and the seats of our great universities.

Having mastered somewhat in detail the political and commercial geography of the United States, the pupil advances to the discussion of these same branches in each of the grand divisions of the world. The underlying principle which we found in the discussion of the geography of the United States must be retained in all subsequent similar investigations. True, we shall not be able to go so much into detail, but still the pupil must understand that the political and commercial geography of every continent are the direct outgrowth of the physical geography of that continent. When he studies South America, he must observe that

the physical conditions of Brazil are such as make that country a great coffee country. He must learn that Rio de Janeiro is the collecting and distributing depot for this product. He must determine the great markets for coffee, and then see by what means coffee is carried from Rio de Janeiro to those markets. Similarly, he must discuss the wheat and cattle industries of the valley of the Rio de la Plata, the sheep industry of Australia, the diamond fields of South Africa, the wheat fields of Russia and India, the cotton of India, the rice of China and the coal and iron of England.

Throughout all this discussion he must observe the natural routes of travel between trade centers, must see how Nature has fashioned certain harbors so that there may be established on their shores termini for routes of trade, must know where man has improved these natural routes of trade; for example, in the construction of the Erie, Suez and Manchester canals, and, finally, how he has established great trunk lines of international railways along the lines of least resistance.

In the discussion of the political geography of the world, he must learn the forms of government and capitals of the different countries. When he studies boundaries of different countries he should follow along lines suggested in the first chapter, and determine the effects of certain natural boundaries upon the life of the people. With fifth grade children this work must be given largely by the teacher. Yet the children will be able to grasp enough of it to help them to comprehend in a large measure why the chief boundaries of the different countries are in certain positions.

CHAPTER VI.

Frye's Complete Geography. Pages 1–27.

THE NATURAL FORCES THAT HAVE SHAPED AND ARE SHAPING THE EARTH FOR THE HOME OF MAN.

In taking up the work of Frye's second book we may fairly suppose that the author will follow the same general lines of thought carried forward in the first book. As a matter of fact, a real unity pervades both texts. This unity is manifested not merely in the arrangement of material, but in the foundation principle. Mr. Frye has written a second book which is adapted for more mature minds than is the first. A few additional principles are brought out, but in the main he has given us broader and more definite views of these principles which he formerly stated in the simplest manner. Possibly the purport of the second book can be illustrated by the statement that the author uses a larger magnifying glass through which to look at the world. We must remember that a greater magnifying power means a smaller field of view. This point is nicely illustrated by the different way in which Mr. Frye treats the geography of the United States. He now breaks that country into sections, each section in turn passing under more careful scrutiny of the more mature pupil.

While in the second book, as in the first, Mr. Frye seeks to show that the other forms of geography grow out of, and are dependent upon, physical geography, he nevertheless recognizes that the pupils for whom he is writing are more mature. In the first book there are very few statements of bare facts. That book is neither didactic nor expository. In the second book this plan is changed. The author, in column after column of the first twenty-six pages, gives the reader definite, clean-cut statements, pregnant with truth. His style is concise and explicit. It is taken for granted that the pupil is now mature enough to grasp these truths, tersely stated, and that if he has any difficulty it is the teacher's business to lead him to the comprehension of these truths by processes similar to those used by the author in his first book. Formerly the pupil was led to discover new truths by means of investigation. Now the truth is presented to him in definite form, and he must reflect upon it, using it as a basis for more general conclusions. This is the essential point of difference between the "Primary Geography" and the "Complete Geography." In other respects the books are similar.

When Mr. Frye introduced the primary student to geography he sought to establish, by observation and inductive reasoning, several great geographic principles. These principles he used in all his subsequent treatment of the subject, nor does he now discard them. He, however, recognizes that the human mind is ever attempting to reach more general conclusions, that the work of the greatest philosopher is to reduce human knowledge to the most general propositions possible.

Of this universal principle he now wishes to make practical application. No longer is it sufficient that the child shall see that there are nine great geographic principles. These must now be grouped, in order that the pupil shall appreciate in their most general statement the great forces which are at work transforming the surface of the earth so that it may be used as the abode of man. Reduced thus, the pupil will see that there are but three forces at work: the physical forces, the chemical forces and the life forces. Possibly if the author were to write a third book, adapted to even more mature minds, he would group the last two forces in one comprehensive principle, and thus specify that in the final solution of this question the student of geography need consider but two great forces in active operation upon the earth's surface.

In Chapter I we called attention to the fact that the principal lines of human activity are agriculture, manufacturing, mining and transportation; and we also showed, in a general way, how physical geography contributes to an adequate understanding of these forms of industry. In attempting to discuss how the earth has been, and is being, prepared for the home of man, we must remember the chief characteristics of man's abode; what are the essentials of a good agricultural district; what makes a good manufacturing locality; under what conditions can mining be profitably followed; how, where and why is transportation carried on; where do people live and why do they live in those places? Keeping in mind these questions, we shall be able to see more clearly how the physical, chemical and

life forces are aiding in the solution of these problems which arise in the field of humanistic geography.

One other thought must preface the accurate analysis of this portion of the text. Many of us were taught years ago that the earth came from the hand of its Maker complete in every detail, and just as it is at the present time. When our minds were disabused of this idea the awakening was both rude and painful. We found it difficult to adjust our faith to the idea that the world was never completed, is not now completed and never will be completed. Still, science left us no alternative, and we finally were forced to the belief that the world is being made in the unending present; that the forces which are now at work are the forces which have been at work since the foundations of the earth were laid; that these forces are as busy now as they ever have been, and that the changes are now as rapid as were the average changes in geologic times. The child who is taught by the more modern method gets a truer appreciation of the element of time in the construction of the earth. Ravines, gorges, glacial marks, coral reefs, subsidence of continents and the formation of plains all impress upon the youthful mind that in the workshop of Nature "A thousand years are but as yesterday and as a watch in the night when it is past." Mr. Frye deserves some credit for the way in which he has brought this thought to the school children of America. Thereby, in the study of the only science which is taught all school children, he lays the foundation for a more correct knowledge of real scientific truth.

The physical forces which Mr. Frye shows as busily at work in fashioning the surface of the earth are water, heat and wind. Sometimes these act separately, but more often in unison. The chemical forces are seen at work in the decomposition of rock, in the formation of caverns, in the production of carbonic acid gas and in the purification of the atmosphere. The life forces operate in covering banks with vegetation, in producing vegetable mold, in building coral reefs and in forming great limestone strata. The intimate relation existing between the chemical and life forces is apparent in that nearly every change brought about by life or death is a chemical change. The pupil who finishes the first twenty-seven pages of this book, with his scientific knowledge thus clarified and systematized, will have laid a good foundation for subsequent study, either in the laboratory or the home. Such a knowledge will help to banish superstition and enthrone reason.

Some teachers have a tendency to instruct their pupils relative to detached and separate items of truth, each of itself valuable, but taken as a whole entirely disconnected. This tendency should be overcome. Here, within a few pages, Mr. Frye sets an example. The location of the oceans, the causes and effects of rainfall, the formation of springs and streams, the transporting power of rivers, the work of snow and ice, the formation of river systems by means of basins and divides, the erosive power of rivers, the building of flood plains and deltas, the shaping of coastal plains and lake plains, the fashioning of shore forms, the movements of waves, the flow of ocean currents and

the throbbing of tides are all set forth as the means whereby Nature is using water in shaping the earth for the home of man. Moreover, when thus viewed, the intimate relation existing between these various forms is abundantly illustrated. None of them act alone, all work together.

Similarly, the author unifies the work of heat. The simplicity with which he discusses the way in which the earth is heated and lighted leaves little to be desired. The teacher who will follow the text closely, supplementing it with the use of a globe, will escape many perplexing questions and still give her pupils those portions of this much discussed question which they are able to understand, and upon which scientists are agreed. Here the author lays the foundation for mathematical geography. Enough is given to show how the location of the tropics and Arctic circle are determined by the inclination of the earth's axis and the movements of the earth about the sun. The pupil can thus see for himself that these lines are not arbitrarily determined. The reasons why heat belts are not constant and isotherms are not parallel to the equator are also shown to depend upon the physical structure of the earth. To assist the pupil in gaining a clearer conception of some of the fundamental principles of mathematical geography, the following experiments are suggested: —

Drive in a south window sill a long vertical nail from which the head has been cut. Let it project above the sill about three inches. Require the class to measure the shadow cast by this nail at noon each month of the

school year, being sure to obtain the accurate length of the shadow at the time of the spring and autumn equinoxes and the winter and summer solstices. Preserve a record of all observations. Let the class draw conclusions with reference to the height of the sun at the different seasons of the year. Next erect in a south window a north and south vertical plain, such as a sheet of stiff paper. Place some opaque object, as the point of a lead pencil, near the south edge of this plain; note and mark the direction of the shadow cast by this point on the plain at noon. Transfer this line, showing the direction of the shadow, to a blackboard on the west side of the room, being careful to preserve the exact inclination. Leave these lines on the blackboard throughout the season. Represent their direction at the time of the solstices and equinoxes by different colored crayons. Make the observations every time you measure the length of the sun's shadow. Draw conclusions with reference to the direction of the sun's rays at the different seasons of the year. Compare these conclusions with those reached by measuring the length of the shadow. Let pupils determine for themselves the relations existing between the height of the sun and the seasons of the year.

Quite properly the author groups in very close relation Winds and Rainfall. Correctly to understand this twofold problem it is necessary to know something of the laws governing the mixture of warm and cold air, the general direction of prevalent winds and the conditions governing evaporation and precipitation. These are topics which are usually taught in the department

of physics. If a teacher's knowledge on these points is not correct and accurate, she should carefully review the subjects as discussed in a first-class text-book on physics before trying to teach this portion of the geography. Granted, however, that her knowledge is sufficient, Mr. Frye's presentation of these points is clear enough to enable pupils to get correct ideas not only of facts, but of general laws. This part of the book demands that the teacher's knowledge of the subject must be more extensive than that covered by the words of the text. Probably no other phase of physical geography will be more often referred to or more frequently used than that chapter which treats of winds and rainfall. Knowing the winds, rainfall and relief form of any continent, the pupil will more and more appreciate the fact that he can predicate, without studying the exact text, the forms of animal and vegetable life, not only native to any given locality, but which may be introduced into that locality. He will see that possibly these agencies have the most to do in fashioning the surface of the earth so that it is adapted to agriculture, manufacturing and transportation.

CHAPTER VII.

Frye's Complete Geography. Pages 27–99.

THE PHYSICAL GEOGRAPHY OF THE CONTINENTS.

In this portion of the book the principles governing the order of presentation of continents and allotment of space are different from those which obtained in the corresponding portion of the smaller geography. The grand divisions are no longer discussed in the order of their increasing complexity, but in the probable order of their diminishing importance to the future American citizen. Mr. Frye has undoubtedly been led to depart from the scientific arrangement of his subject-matter because so many pupils are compelled to leave school before having an opportunity to finish the "Complete Geography." Such pupils should be familiar with the geography of North America, South America and Europe, even though they have no opportunity to amplify their general knowledge of the other three continents.

Of the seventy-two pages devoted to the physical features of the continents a little more than one third are devoted to North America; and of the twenty-five pages thus used, the greater number are given to the United States. Mr. Frye himself states in a footnote on page 30 why this apportionment of space is made:

— "Not only because we ought to know the geography of our own country, but also because a full knowledge of the surface and resources of our land affords the best key to its history." The full import of this statement should be grasped by the teacher of geography and the teacher of history. When it is fully comprehended the real basis for the correlation of these branches will be understood.

The arrangement of the text in the "Complete Geography" presupposes that the pupil has completed the "Primary Geography." In the study of any given portion of the larger book, the teacher should, therefore, make use of the pupil's general geographical knowledge of the entire world; whereas, in using the smaller book, the teacher is always confronted with the fact that there is ever before the pupil an unexplored region, which is either a land of terror or a land of promise, according to the way it is approached. The attitude of the child's mind is different in the study of the two books. While studying the smaller, it is comparable to that of an explorer who traverses an unknown region; while studying the larger, it is comparable to that of the prospective settler who examines a locality to determine the most promising site for a settlement. With the "Primary Geography" each pupil is a LaSalle; with the "Complete Geography" he is a Daniel Boone. This difference is recognized by Mr. Frye. Note the way he treats the physical geography of North America in the two books. Every general topic discussed in the large book is touched upon in the smaller. There is a difference, however. In the primary book two columns

are devoted to the Rocky mountains; in the complete text these mountains with their subdivisions are given eighteen larger columns. The detail is filled in. An important principle governs the selection of such detail. The average teacher introduces simply the description of scenery. Railway folders, photographs, personal narrative are all used to interest the class and make more vivid the pupils' mental pictures. Such descriptions are entertaining and possibly have their place. Still this is not teaching geography. Observe Mr. Frye's first sentence in his "Complete Geography":— "This book describes the earth as our home." In our last chapter we showed that in the first twenty-six pages of his "Complete Geography" the author treats of those forces which have shaped and are shaping the earth for the home of man. In the next seventy-two pages he describes that home. To the student of geography the Willamette valley is of vastly more importance than the Yellowstone park, simply because it is the home of a thriving people rather than the stopping place of an occasional tourist. The entertaining descriptions of snow-capped mountains, with their precipitous sides and deep gorges, are not the material with which the geography lesson or text should be filled. This is the property of the lecturer, the essayist and the kodak fiend. What relation do the mountains in question bear to mining? How do they affect the winds and rainfall of neighboring lowlands? How do they serve as a barrier to commerce, a defense to a nation, a boundary for a race? These are the questions which should engage the attention of teacher and pupil. Such

is the detail with which, in his "Complete Geography," Mr. Frye fills in the large outline drawn in his "Primary Geography."

The pupil who is engaged with this portion of the book is supposed to have attained a maturity both as to study and age which enables him to undertake the solution of certain geographical problems. Such mental effort will not only test his real knowledge of principles, but will help develop his reasoning powers. It is therefore suggested that some time be given to such questions as the following: —

Suppose the Coast Range mountains were higher than the Sierra Nevada; what effect would this have upon the rainfall of central California?

Suppose the Coast Range and Sierra Nevada mountains to remain at their present altitudes, but the former to extend unbroken along the western coast, how would the interior of California be changed?

If the Sierra Nevada mountains were lowered to the height of the Coast Range, how would it affect the rainfall of California? of Nevada?

What effect would increasing the velocity of the lower Mississippi have upon the character of the soil deposited along its banks and at its mouth?

Compare central North America with central Eurasia. Suppose a body of water equal to the Great Lakes were placed in the north central part of Eurasia, how would it affect the extremes of heat and cold in that continent?

How does cutting the forests around the head waters of a river affect the river? Study in this connection the Hudson and Rhone.

Account for the rainfall in the valley of the Po.

If the velocity of the Nile could be increased, how would it affect the delta at the mouth of that river?

Suppose the trade winds should stop blowing, how would that affect the vegetation of South America?

Suppose water contracted when freezing, how would that affect the rivers and lakes in the temperate zones?

If water contracted when freezing, would rocks weather more or less rapidly then they do now?

Suppose, owing to the elevation of the ocean bottom, the Gulf stream were deflected so that it flowed straight east from Florida to Europe, what would be some of the probable results?

Suppose the axis of the earth were inclined 15°, 30°, or 45°, what would be the width of the various zones in each case?

It is not intended that the above serve as a complete list of such problems nor that their solution shall constitute a regular class exercise. Whenever pupils are called upon to discuss such questions they should be required to give the course of reasoning by which they arrive at conclusions. If, starting from supposed data, a boy can reason logically and arrive at the proper conclusion, it is fair to suppose that he has such a knowledge of principles that his conclusions drawn from the examination of actual data will be sound. This plan of work tests his comprehension of underlying geographical principles.

The relief maps found in this portion of the book should be studied and constantly consulted by both teacher and pupil. They constitute as distinct and im-

portant a feature as do the words of the text. Without them pupils would often fail utterly to understand the true relation physical geography bears to other branches of the science. By omitting all names and boundary lines from these maps the author enables the student to fix his entire attention upon relief forms. Every line and every piece of shading contribute to the one end in view. As location of places is necessary in order to use the relief maps intelligently when studying the text or discussing the lesson, the author has hit upon the plan of printing key maps on the opposite pages. Many teachers use these maps, the relief and the key, simply in connection with the lesson called "Map Studies" which accompanies each relief map. Such use of these maps is wrong. True, they are to be used with the map studies, but they are also to be used with nearly every lesson in the book. They constitute a great object lesson which should continually confront both pupil and teacher, showing ever that political geography, commercial geography and vital geography grow out of, and are dependent upon, physical geography. As well drop Hamlet from Shakespeare's great drama as omit the relief maps from Frye's geographies.

Permit a few illustrations: —

On page 81 we find the statement: — "The Scandinavian peninsula is in the path of the moist westerly winds. The steep western slopes therefore receive much heavier rainfall than the lowland on the east." Turn to the relief map on page 74 and reinforce this statement. Next direct the pupils' attention to the

relief form of France and the Netherlands. Discuss the prevalent winds and permit pupils to prophesy the rainfall. Now turn to Lesson 84 and see if the prognostications are correct.

Read on page 65 concerning the Indus and Brahmaputra rivers. Note how they rush through narrow deep valleys, cutting for themselves pathways in the solid rock and breaking down that which impedes their progress. Turn to the relief maps on page 62 and see how such a condition is represented. Observe next the Hoang-Ho river and permit the pupils to draw their own conclusions concerning the rapidity of this stream and the nature of the valley through which it flows. Let them next read a paragraph or two on page 69 and see if their reasoning is correct.

Taught thus, pupils will soon learn that a relief map is an open page from which can be read as easily as from print much of the geography of a continent. The ever recurring question should be, "What does the relief map say?" The ability to read a map is one of the greatest advantages to be derived from the study of geography.

We learn much by comparison. It is upon the relation that one item of knowledge bears to other items that its chief, if not its total, value depends. It is not only true that "No man liveth unto himself alone," but it is equally true that no knowledge standeth by itself alone. Later we shall apply this principle to the study of commercial geography; now we shall use it with reference to physical geography.

On studying any given continent be sure to compare

it with continents previously studied. These comparisons should bring out both points of resemblance and points of contrast. When all continents have been considered in this manner take up in succession such features as highlands, lowlands, river systems, shore forms. Make each feature a general topic and study it with reference to all continents. This plan will give the pupils a series of cross-references concerning geographical data.

Let us illustrate. Suppose the continents have been studied in turn and each compared with the others. How shall the physical geography of the world be reviewed? To go back over the book in the order it was first studied will awaken little interest and make nugatory the study period of pupils. Boys and girls will think they know it all and will not attempt to prepare their lessons. If, however, the teacher assigns such a general topic as The Lowlands of the World, then subdivides it so as to bring out their location with reference to continents, zones and prevalent winds, their rainfalls, their drainage, their climate and their ability or inability to support a population, she will arouse intense interest and provoke enthusiastic study. For the benefit of the slower pupils it will be well to give definite references to the pages where these topics are treated. The average pupil will, however, do most of this studying by simply comparing the relief maps,— "A consummation most devoutly to be wished." A final review of the continents conducted along these lines rearranges the fragmentary knowledge a pupil has previously gained, so that he no longer sees each con-

tinent by itself, but rather the entire earth as a unit. Thus, starting in the "Primary Geography" with the thought that the earth is a unit, he returns at the conclusion of his study of physical geography in the larger book to the same idea, — the earth is a unit. Analysis, then synthesis, has been the order. The circle is complete. The unity to which the pupil returns is different from the unity from which he started. His new unity is made up of infinite variety, yet so harmonized that there is no confusion. Thus taught, the child need take but one more step to come face to face with the vitalizing thought that there is a Something which plans and controls world forces so that they work together in complete accord.

Such we believe to be the general thought pervading this portion of Frye's "Complete Geography."

CHAPTER VIII.

Frye's Complete Geography. Pages 99–119.

VITAL GEOGRAPHY.

THE general principles governing the corresponding portion of the smaller book, as described in Chapter IV, will be found to obtain in the work now before us. As the pupils are two years older than when they began the study of vital geography, the author brings to their consideration some new truths which were beyond their comprehension at the earlier period.

Teachers and pupils, when studying the races of men, plants and animals, should keep constantly in mind the fact that Frye's "Complete Geography" "describes the earth as our home."

One of the most important relations that physical geography bears to racial geography is set forth by Mr. Frye in the statement:—"The home of each race is bounded on nearly all sides by oceans, deserts or lofty highlands." The author follows this generalization with several illustrations, then emphasizes it in the study of each separate race, and finally clinches the thought in his Review of the Races, as found in Lesson 104. Much, however, is left for the teacher. She must bring pupils to see the reason which underlies this condition. When they comprehend that the primitive

races could not cross oceans, deserts or lofty highlands, they will have mastered a truth that will be of much subsequent use to them. Starting from this fundamental proposition, lead the pupils to see that as the races became more civilized they worked their way through mountain passes into new valleys, from oasis to oasis across barren deserts into new fertile regions, along dangerous coasts to new islands. Tell of the Teutonic invasion of central Europe, the exploits of Hengist and Horsa, the journeyings of Lief Ericson. Boys and girls will quickly see that the means of communication were still so difficult that settlements planted under such circumstances could have very little communication with the original race. In time there would thus spring up the various subdivisions of the five great races, each with its own peculiarities, but each in turn having certain characteristics which plainly designate the parent race to which it belongs. Do not stop here. Lead the pupil to take one more step. Having taken it, he will see that as civilization advanced man discovered means of communication, no matter how difficult the barriers which separated tribes, nations or races. After inventing the compass he was no longer obliged to skirt the coast, but could boldly venture across seas and oceans. Commerce as well as discovery came with this invention. Military roads were the precursors of tunnels, bridges and railways. The tendency of to-day is to break down barriers and to bring the different races into closer touch. The civilizing influence of commerce, made possible by modern invention, is a principle with which even grammar grade pupils should be familiar.

While considering the effects of mountains, oceans and deserts upon the organization of races and their subdivisions, it will be well to illustrate with examples and story the relation the physical features of the world bear to the military and political history of the nations. The Alleghanies, the Pyrenees, the Alps, the Dardanelles, the English channel, the Danube, the Nile, Khyber pass and the Atlantic ocean have each borne an important part in determining the rise and fall of dynasties and nations. The stories of which they form the nuclei are more fascinating than romance — they are a key to history.

Coupled closely with the thought relative to the effect of oceans, deserts and lofty highlands upon the separation of the human family into races is another; viz., the original homes of populous races were in fertile valleys where indigenous food grew in abundance; and, even to the present day, the population of the world is located in the lowlands rather than the highlands. The teacher who cares to reinforce what Mr. Frye says upon this subject can read with pleasure and profit certain portions of Buckle's "History of Civilization in England," especially his General Introduction.

This same chapter from Buckle will acquaint the teacher with many interesting facts bearing upon the relation of physical geography, including climate, to the development of the different races. Though more recent writers dispute some of Buckle's conclusions, his leading premises are undoubtedly correct. Mr. Frye would have pupils understand that the Caucasian

is the race whose history is marked by achievement, whose influence makes for civilization. Moreover, he would have them see that this same race has been more fortunate than any other in its physical environment.

Instructors who teach Mr. Frye's chapter upon the Races of Men, according to the preceding suggestions, will lay a correct foundation for the subsequent study of history, whether their pupils pursue that line of investigation in school or by private reading.

In teaching the chapters upon Plants and Animals, it should be remembered that from the standpoint of the geographer plants and animals are important in proportion as they minister to the needs of men or influence geographical conditions. Plants may assist man by furnishing him with food, clothing, fuel or building material; may hinder him by the luxuriance of vegetation. They always exercise a direct influence upon rainfall and temperature. Animals help man by assisting as beasts of burden or by furnishing him with food, clothing and occasionally fuel.

The first question in studying the flora of any region is: What are the climatic effects of the vegetation? The second: Does this vegetation assist or retard civilization? Of course it is not sufficient to answer these questions with monosyllables. They are intended to open up lines of discussion. Having discovered the general effects of the vegetation, the teacher should next lead the pupils to divide the flora into four groups; viz., plants which furnish man food, clothing, fuel or building material. Plants that do not readily drop into one or the other of these groups should not be

studied in detail in the geography class. If they are in sufficient numbers to be of importance, their mass effect has been considered in determining the climatic and civilizing effects of the vegetation of the region. Why expect pupils to memorize forty or fifty species of plants growing in the tropics? Let them see that the plant universally used for building purposes is the bamboo; and that this plant is better adapted for such use than is any other kind in that region. Next let them discover what plants furnish the little clothing necessary for the dwellers within the tropics. Follow this with the names of eight or ten plants which furnish food, not only for the natives of that region but for people living in other zones. When the names of these three kinds of plants have been mastered and their characteristics learned, the remaining vegetation of the torrid zone can be grouped in one great mass and studied merely in its effect upon climate and civilization.

If pupils study Frye's chapter on Plants from the above-described standpoint, they will reach some interesting and valuable generalizations. Take, for instance, the question of fuel. They will see that within the tropics fuel is unnecessary except for cooking purposes; that in the temperate zones it must be used for both cooking and heating; that the hard woods are best adapted for this purpose; that coal, the flora of another age, is here used for the same purpose; that in the polar regions the fats of animals are the only fuel used.

Quite similarly the student of geography need not

attempt to memorize a complete list of the animals native to any given zone. It is sufficient if he know what animals assist man either as beasts of burden or by furnishing him with food or clothing. It is not important that he have impressed upon his mind the fact that great herds of bison once roamed over the American prairies, but he should understand that great herds of cattle and flocks of sheep now pasture upon those same prairies. When studying the fauna of the tropics the average pupil is swamped by the great number of animals whose names he is called upon to memorize. Mr. Frye would have the teacher realize that the pupil is studying the description of the earth as our home; consequently, there is no need of requiring geography pupils to consider any animal unless it comes in direct relation with man. Rather than commit to memory the names of all the tropical animals, let the pupil see, first, what animals assist man as beasts of burden. In this list he will classify the elephant, the horse, the camel, the ox and llama. As animals which furnish food he will classify the camel, the goat and the sheep, and will at the same time reject the carnivorous animals. Quickly the child will advance to the generalization that the flesh of animals is not a good diet for people living in the tropics, and that consequently they are not inconvenienced by the absence of herbivorous animals. He will, however, look ahead and see that such animals are found in abundance in the temperate zones where pasture lands are plenty and animals furnish a necessary article of food. Only a limited number of tropical animals will be grouped in the third

class — those which furnish man clothing. This is in accordance with nature's demands. When the pupil has thus grouped the animals of the torrid zone, the teacher may safely omit the names of the monkeys, baboons, crocodiles, boa-constrictor, iguana, jaguar, tapir, armadillo, hippopotamus, rhinoceros, hyena, giraffe and scores of others that may possibly be considered at a later date by the class in zoölogy.

The interrelation existing between certain vegetable and animal life should be shown; *i.e.*, pasture lands and cud-chewing animals, hog area and corn belt, sheep and poorer grazing land. It will be interesting to note how man has taken advantage of this principle and utilized certain regions which were naturally unproductive.

Finally, as pupils combine their knowledge of animal and vegetable life they should be led to see that as we go either way from the equator toward the poles that which man needs for food, for clothing, for fuel, for building material, changes with the changing climate, but that Nature arranges in each case for his new needs. If necessary supplies are not provided outright, the conditions are such that man can produce that which is required.

CHAPTER IX.

Frye's Complete Geography. Pages 119–175.

HUMANISTIC GEOGRAPHY.

In this portion of the book the pupil enters upon the study of that part of geography which will prove of more practical benefit to him than any other. He examines the humanistic phase of the subject. He is not now primarily concerned with those physical forces which have shaped the earth for the abode of man, but rather with the manner in which man utilizes the resources of the world for his own necessities and enjoyment. What portions of the globe has man made to bring forth and blossom as the rose? Where does he obtain his food, his clothing, his fuel, his building material? Where does he delve beneath the surface of the earth that he may transform his civilization into an age of iron? Wherefore has he become familiar with the trackless deep? To what purpose has he bound state to state, country to country, with double bands of steel? Why has he compelled the lightning to carry his messages across continents and beneath oceans, to reproduce in distant cities the tones of his own voice and to drive sable-winged Night from the streets of his metropolis? These are some of the questions which shall engage the pupil's attention.

From their consideration he should come forth with a working knowledge of the business geography of the world.

Mr. Frye precedes the study of the products of the United States by the examination of the temperature, winds and rainfall of the country. The maps with which he illustrates this portion of the book are invaluable — they are an epitome of the text. The pupil must either photograph them upon his memory or turn to the original again and again.

In discussing the various products, as cotton, wheat, corn, the author uses the following outline : The physical conditions under which the crop flourishes ; the producing area ; the collecting centers; the markets; domestic routes of trade ; the world's producing area and collecting centers; the world's markets and routes of trade. Physical conditions and producing areas are not only described in words but pictured by maps. If the country produces a greater amount of any commodity than it needs that fact is noted and the export market is named.

To illustrate the method of teaching this portion of the book take the subject Cotton. Though this topic is discussed in Chapter V, we again outline it in order to illustrate the broader way any given question is treated in the "Complete Geography."

The first question is, What are the physical conditions under which cotton flourishes? The answer is definitely told at the bottom of the first column on page 130.

Next, What are the cotton areas of the United

States? Turn to the Rainfall and Climate maps, and permit the pupils to discover for themselves the cotton belt. Reinforce their conclusions by the author's statement as found at the top of the second column on page 130. Compare both these findings with the Cotton map itself. The final results are thus reached by three processes of reasoning, and should be the same in each case.

The pupils are now ready to investigate the third topic; viz., What other countries produce cotton? In the very first paragraph of Lesson 129 the author directs this investigation. Though they have neither Rainfall nor Climate maps of these countries, boys and girls will quickly see that the physical conditions of the foreign cotton areas are very similar to those of our own cotton belt. The characteristics of cotton, the methods of planting, cultivating and harvesting the crop will prove interesting themes at this point.

The next topic is, The collecting centers, both domestic and foreign. Now is the time to turn to the geography of the Southern States, as treated on pages 147–150, and study everything bearing upon cotton. Later we should revert to the map of these states when studying such general topics as sugar, corn, tobacco, forests, iron and coal. Quite similarly the lessons upon India and Egypt should be read and the maps examined, that clear, distinct and accurate ideas of the producing areas and collecting centers in these countries may be formed.

Having determined the centers at which the cotton crop is collected, the pupils should next be expected

to locate the markets; *i.e.*, the places where the cotton is manufactured into cloth. In this connection they should study the geography of New England, as described on pages 142–144, and of England, as described on pages 162 and 163; or rather that portion of this geography which relates to the manufacture of cotton fabrics. Pupils may wonder why cotton cloth is not manufactured in the immediate vicinity of the cotton fields. Teachers should be ready with an interesting bit of history, giving the pupils an opportunity to see that when the United States embarked in the manufacture of cotton the labor of the South was performed by slaves who had not the intellectual training necessary for skilled laborers. The raw cotton was therefore sent to a region where it could be manufactured by white labor. Cotton mills were established before steam was applied to manufacturing. Water power was used to drive the machinery of these mills. The best water power in those regions of the North which were then settled was in New England. The mills were therefore established in that locality, and the most intelligent labor was directed to the manufacture of cotton fabrics. Since the abolition of slavery in the South, labor has been looked upon differently, and there are many skilled workmen, both black and white. Steam is supplanting water as a motive power. A result of these changes is the erection of many cotton mills in the South and the manufacture of the finished product in the very region where the cotton is grown. By this means the cost of shipping the raw cotton to New England and the manufactured cotton

back to the South is saved, and the mills of Georgia have this important advantage over the mills of Massachusetts.

The leading manufacturing districts are a long distance from the cotton raising districts. This gives rise to the next topic, — the routes of trade. Turn to the chapter upon Highways of Trade, and learn how New Orleans, Galveston, Calcutta, Bombay and Alexandria are connected with Boston and Liverpool.

Lastly, determine the markets for the manufactured cotton cloth and the routes by which it is shipped to the consumers.

Pupils who study the subject of cotton according to the above plan will acquire a knowledge which, while broad and comprehensive, is, at the same time, accurate and unified. The other general products can be studied in a similar way. Even grammar grade pupils will see that most of the world's business transactions are concerning the production or transportation of food, clothing, fuel and building material.

The plan for studying sectional maps indicated in the discussion of cotton should be followed in the investigation of other products or industries. The map and description of New England will be studied in connection with cotton, wool, hides, forests, fisheries and building material; the Middle Atlantic states with coal, iron, building material and tobacco; the Southern states with cotton, sugar, rice, tobacco, corn, hogs, coal and iron; the Central states with wheat, corn, oats, barley, cattle, hogs, sheep, coal and iron; the Western states with fruits, wheat, grazing and the

precious metals. Each of these products has a general topic devoted to it. When investigating that topic, study in connection therewith the sectional map or maps which throw light upon it. Each map will thus be studied as many times as there are important commodities produced in that region.

This plan of studying the sectional maps has many advantages: it does away with the tediousness usually attendant upon this portion of the geography; it furnishes definite aim for the pupil's research, and it removes vagueness and indistinctness with reference to localities referred to in the general discussion of the subject in hand.

When studying the product maps pupils should be taught to superimpose one map upon the others, thus determining the variety of resources incident to any section. This work will be much more satisfactory than when first attempted while studying the "Primary Geography." This time pupils will be able to draw valuable conclusions concerning the advantages arising from a diversity of industries.

Pupils will be much interested in comparing different regions in this respect. To illustrate: Notice that the only product map which covers certain sections of North Dakota is the Wheat map, while, on the other hand, Southern Michigan is covered by the following maps: Wheat, Corn, Oats, Forests, Fruits, Beef Cattle, Dairy Products, Sheep and Coal. If the wheat crop of North Dakota is ruined, farmers have nothing to fall back upon; whereas, if the wheat crop of Southern Michigan is injured the citizens have many other

sources of revenue. In Dakota the prosperity of merchants, bankers, railroad people, in fact the entire population, depends, directly or indirectly, upon the wheat crop. Though the people of Southern Michigan may raise quantities of wheat, their industries are so diversified that the population at large may still have a prosperous year, even though the wheat crop is ruined entirely. Another illustration: Central Florida is covered by the Fruit map and a light shading of the Forest map. This shows that the country depends chiefly upon fruits for a source of revenue. A killing frost not only destroys the orange crop, but the trees as well and ruins the prosperity of the region for years to come. It is interesting to note further how this fruit industry depends upon the development of railroads. Not until the invention of the refrigerator car were fruit growers able to have other than a local, and consequently limited, market for their product. Fruits were too perishable for ordinary transportation. With the invention of such cars and the organization of through fast freights perishable fruits are shipped from the Gulf to the Great Lakes and from the Pacific to the Atlantic, thus giving to the fruit growers a market in the farthest corner of the country. The increasing production keeps pace with the developing market.

The interrelation of certain industries is nicely illustrated by the Product maps. The Corn and Hog maps cover practically the same areas; in fact, the Beef Cattle map differs but little from either of the two mentioned. No other Cereal map so nearly corresponds in area to the Hog and Cattle maps. This leads to the

inference that corn is more extensively used as a food for such animals than is any other grain. A comparison of the Dairy Products and Beef Cattle maps will suggest to the wide-awake teacher two interesting thoughts. The cheaper lands of the West make possible the pasturing of large herds of cattle. Such herds are so far removed from the centers of population that it is not profitable to ship milk or make butter. On the other hand, the farming lands of New York, Pennsylvania and Ohio are so valuable that they cannot be used for pasturing great herds of cattle, and the proximity of these sections to the centers of population makes profitable the shipment of dairy products. Thus while the Beef Cattle map covers every part described in the Dairy Products map, and more too, the darker portion of the former map is different from the darker portion of the latter. The maps of Coal, Iron, and Iron and Steel Manufacture speak volumes to one who knows how coal is used in smelting iron ore and how iron is transformed into steel. Unless teachers are informed on such topics they should not attempt to teach Sections 140 and 141. The advantages incident to finding iron and coal in close proximity are the underlying cause for the wonderful development of such cities as Chattanooga and Birmingham. Moreover, the separation of the Michigan iron mines from the coal fields of Illinois, Indiana and Pennsylvania makes possible the most wonderful inland carrying trade in the world.

If, in connection with the various things raised or manufactured in the United States, the pupil is led to take a world-wide view, as he did in studying cotton, he

will be surprised to find how little of the world's business there remains for him to examine after having completed the geography of the United States. This country of ours is wonderful in its natural resources; its people are unsurpassed in their activities. With its new possessions almost every line of enterprise is represented. The mature pupil thus makes the United States the center from which he studies the industries of the world. How are these world enterprises related to his own country? What are the business relations uniting his native land to the world at large? The final thought crowning his three years' study of geography is thus the Interdependence of Nations. Such a conception enriches his understanding, broadens his patriotism and makes more generous his humanity.

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